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CLAIMS

1. In an article feeding apparatus of the type in which sheets and other flat articles are caused to move downstream along an article flow path, the improvement comprising a device called a prompter, for moving articles along the flow path, which prompter comprises:

a shaft, running transversely to the flow path;

a first roller, mounted on the shaft;
a body, having a first end and second end lying along the body length, the first end pivotably engaged with the shaft, the second end movably positioned upstream of the first end;

a second roller, mounted at the second end of the body;

a belt, mounted on and endlessly running around the first and second rollers, having a surface adapted to frictionally engage and move downstream articles along the flow path; and,

means for moving the belt around the rollers.

2. The apparatus of claim 1 further comprising means for imparting to the body a first moment proportional to the speed at which the belt is moved around the rollers; wherein the moment urges the body to rotate around the shaft and thereby press at the second roller end against any article lying along the flow path.

3. The apparatus of claim 2 wherein the means for moving the belt comprises rotating of the shaft; and, wherein the body is frictionally engaged with the shaft to create said first rotary force.

4. The apparatus of claim 2 wherein frictional engagement of the belt with an article resistant to motion imparts to the body, in the same direction as the first moment, a second moment proportional to the resistance of the article to motion wherein both said forces urge the

body to pivot around the shaft to press the second roller end of the body against any article lying along the flow path.

5. The apparatus of claim 1 wherein engagement of the belt with an article resistant to motion along the flow path causes the body to pivot with increased force toward the article surface.

6. The apparatus of claim 3 wherein the belt is elastomer and stretched between the rollers, so tension in the belt holds the body in frictional pivotable engagement with the shaft, to thereby create said first rotary force.

7. The apparatus of claim 1 wherein the belt has a surface comprised of a plurality of transverse ribs having cross sections which mae the ribs substantially deflectable when the belt pulls an article along the flow path.

8. The apparatus of claim 7 wherein the rib height to width aspect ratio of the rib cross section is between about 1.3:1 and 4:1.

9. The apparatus of claim 1 wherein the second roller is mounted on and fastened to an axle at the second end, so the axle rotates when the belt is moved; further comprising a second prompter with the first roller thereof mounted on and rotatably driven by said axle.

10. In a article feeding apparatus of the type in which articles are caused to move downstream along a flow path, the improvement comprising a device called a prompter, for moving articles along the flow path, which prompter comprises:

a shaft, running transversely to the flow path;

a first roller, mounted on the shaft;
a body, having a first end and second end lying along the body length, the first end pivotably engaged with the shaft, the second end movably positioned upstream of the first end;

a second roller mounted on and fastened to an axle running transverse to the body length at the body second end

a belt, mounted on and endlessly running around the first and second rollers;

means for moving the belt around the rollers, whereby the belt causes the second roller to rotate;

a pair of wheels, for frictionally engaging articles, fastened to the axle at opposing ends of the second roller, each wheel having an outside diameter greater than the outside diameter of the belt where it runs around the second roller.

11. The apparatus of claim 10 wherein the axle is pivotable in a plane transverse to the body length.

12. The apparatus of claim 1 where the apparatus is of the further type in which articles are drawn from the top of a stack and delivered to a receiving point downstream, in which the stack height decreases from a first height to a second height, relative to the plane of articles moving downstream along the flow path, due to taking away of articles from the top of the stack;

wherein, the shaft has an elevation intermediate the elevation of the first height and second height, so that when the prompter contacts articles at the top of the first height stack, the prompter pulls articles downwardly toward said plane, to thereby decrease the stack to the second height, then to pull articles from the stack substantially laterally along said plane.

13. In the article feeding apparatus of claim 1, of the type further comprising a singulator comprised of a driver and a retarder, wherein articles move along the flow path toward the singulator, the improvement which comprises: the prompter belt at the first roller comprising said driver.

14. The apparatus of claim 13 wherein the prompter belt has a surface with a groove running along its centerline; and, wherein the retarder is positioned with the groove of the belt.

15. The apparatus of claim 1 comprising a first device positioned downstream from the prompter second end, to receive, frictionally engage, and move downstream articles delivered to the device path by the prompter; first device adapted to move articles downstream faster than does the prompter belt; and, the means for moving the prompter belt comprising an overrunning clutch, so any article frictionally engaged simultaneously with the first device and the prompter belt is moved faster than is dictated by the means for moving the prompter belt.

16. The article feeding apparatus of claim 15 wherein said first device comprises a singulator having a driver mounted on and rotated by said shaft; the driver having an outside diameter larger than the outside diameter of the belt at the first roller; wherein the means for moving the belt comprises rotation of said shaft; the first roller having an integral overrunning clutch.

17. The article feeding apparatus of claim 15 further comprising:

opposing mounting blocks, slidably and detachably mounted on the apparatus, wherein the shaft is journaled at opposing ends in the mounting blocks;

each block slidable along a plane transverse to the length of the shaft, to enable adjustment and removal of the shaft;

disengageable resilient means for keeping the mounting blocks mounted on the apparatus during use;

means for precisely adjusting the position of each mounting block in said plane.

18. In the apparatus of claim 1, of the further type wherein articles move downstream along the flow path and through a singulator nip having a gap spacing, the improvement which further comprises:

a driver for moving articles downstream through the nip;

a retarder, called a dancer, positioned in close proximity to the driver, to form the singulator nip;

the dancer movably mounted to enable a portion thereof to translate generally along the article flow path;

means for resiliently biasing the dancer in the upstream flow path direction;

wherein, the gap spacing between the dancer and driver is changed by translation of the dancer portion in the downstream direction, when an article passes through the nip.

19. In the apparatus of claim 18, the further improvement which comprises:
the dancer having a belt, movable in one direction only around the exterior of a body of the dancer, for contacting articles in the nip and for contacting the driver in the absence of any article in the nip;
wherein, when the direction of the driver is reversed, the driver frictionally engages said belt and causes it to move in said one direction, to thereby expose a new portion of the belt in vicinity of the nip.

20. In the apparatus of claim 18, the further improvement which comprises: the dancer movable linearly; wherein, articles travel through the nip along a line of travel which is at an angle to the direction in which the dancer is movable.

21. In the apparatus of claim 18, wherein the articles move generally along a horizontal plane; the further improvement which comprises: the dancer rotatatable in a vertical plane, responsive to passage of an article through the nip.

22. In the apparatus of claim 21, the further improvement which comprises: the dancer having a belt mounted on rollers, to provide a belt surface at the nip; wherein, rotation of the dancer causes incremental movement of the belt on the rollers.

23. In the apparatus of claim 18, the further improvement which comprises:

means for supporting a dancer body;

the dancer body having a length lying along the flow path and opposing ends for receiving rollers, the dancer movably mounted for linear motion on said means for supporting a dancer;

rollers pivotably mounted at opposing ends of the dancer body;

an endless belt stretched over the rollers and around the body, wherein a portion of the surface of the belt contacts articles at the nip; and,

wherein, the belt surface portion is movable in the upstream direction only.

24. In the apparatus of claim 18 wherein articles move along a flow path that lies generally in a first plane, the further improvement which

comprises:

a dancer having a body pivotally mounted at a first end on a fixed shaft, to pivot in a second plane perpendicular to the first plane, so that the second end is proximate the driver, to thereby form the nip with the driver;

means for resiliently biasing the body rotationally, so the second end roller and belt thereon tends toward contact with the driver, to thereby form the singulator nip; and,

wherein, when an article passes through the nip, the dancer is rotated slightly in said plane, with a component of rotational motion in the downstream direction.

25. In the apparatus of claim 1, the further improvement which comprises:

a first assembly, comprising a prompter, wherein the first assembly frictionally engages articles moving downstream along a article flow path at a first linear speed;

a second assembly configured to take away articles from the first assembly at a second linear speed greater than the first linear speed; the second assembly having at least one second assembly feed roller with a high friction surface, for engaging articles;

wherein, an article is simultaneously frictionally engaged by said second assembly roller and said second assembly as it moves along the flow path;

said second assembly roller coupled to a rotating motor, the combination of motor and roller having a first rotational speed which provides the roller with a first surface speed that imparts to articles said desired second linear speed;

the combination of motor and roller having a polar moment of inertia sufficiently low, such that, when the roller frictionally engages said simultaneously engaged article, the rotational speed of the combination sharply and substantially decreases to a second rotational speed; to thereby provide the roller with a second surface speed nominally matching said article first linear speed; wherein, the roller exerts on the

article a downstream force insufficient to overcome frictional engagement of the article with the first assembly.